

8E8041

Roll No. _____

Total No. of Pages : 3

8E8041

B.Tech. VIII Semester (Main/Back) Examination, April/May-2017

Electrical and Electronics Engineering

8EX1A EHV AC/DC Transmission

Common with 8EE1A

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable by assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) Estimate the corona loss for a 3ϕ , 110kV, 50Hz, 150km long transmission line consisting of three conductors each of 10mm diameter and spaced 2.5m apart in an equilateral triangle formation. The temperature of air is 30°C and the atmospheric pressure is 750mm of mercury. Take the irregularity factor as 0.85. Ionization of air may be assumed to take place at a maximum voltage gradient of 30kv/cm. (8)
- b) Explain how the power handling capacity of EHV lines (AC) can be calculate? (8)

OR

1. a) What is the need of EHV transmission and what are the problems associated with it? (8)
- b) Describe in brief the surge impedance loading of a transmission line. (8)

272

Unit-II

2. a) Two generators are rated at 200MW and 400MW are operating in parallel. The drop characteristics of their governor are 4% and 5% respectively from no load to full load. The speed changer are so set that the generator operates at 50Hz sharing the full load of 600MW in the ratio of their rating. If the power reduce to 400MW how it will be shared among the generator and what will be the system frequency? Assume free governor operation. (8)
- b) Draw schematic diagram of a speed governing system to control the real power flow in the power system and briefly explain it. (8)

OR

2. a) Explain flat tie line load control and the line load bias control method of load frequency control for the interconnected power system. (8)
- b) Explain the two-area load frequency control with the help of block diagrams. (8)

Unit-III

3. a) What is shunt compensation? What is the role of shunt compensation in power system? How it is different from series compensation? (8)
- b) Explain the various conventional methods of voltage control along with advantages and disadvantages. (8)

OR

3. a) Briefly explain the various types of shunt reactors used to limit voltage rise. (8)
- b) What is the role of reactive power on voltage and voltage regulation? What are the components which are responsible for generation and absorption of reactive power in the system. (8)

Unit-IV

4. a) What are the benefits of using FACTS devices? Give the types of FACTS controllers and quantities/parameters being controlled by these. (8)
- b) Explain static VAR compensator with the help of schematic diagram. (8)

OR

4. a) Draw and explain the V-I characteristics of the STATCOM. (8)
- b) With the help of characteristics curves explain the operation of TCSC. (8)

Unit-V

5. a) What is ground return? What are the problems associated with the use of ground as the return conductor? (8)
- b) An existing S ϕ , double circuit AC lines is to be converted to three-circuit DC line. Assuming the same insulation level and unity power factor in the AC systems. Show that : (8)
- i) the ratio of power transmitted by DC to that by AC is equal to $\sqrt{2}$ and
- ii) the ratio of % loss by DC to that by AC is equal to $\frac{1}{\sqrt{2}}$.

OR

5. a) Explain briefly the various types of DC link used for HVDC transmission. (8)
- b) Draw and explain converter control characteristics. (8)



Roll No. _____

[Total No. of Pages : 2]

8E8042**8E8042****B.Tech. VIII Semester (Main/Back) Examination, April/May - 2017****Electrical and Electronics Engineering****8EX2A Electric Drives and Their Control****Common with 8EE2A****Time : 3 Hours****Maximum Marks : 80
Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) What are the advantages and disadvantages of electric drives. (4)
- b) Explain the operation of a closed-loop speed control scheme with inner current control loop. What are various functions of inner current control loop? (12)

(OR)

1. a) Explain the four quadrant operations in motor. (8)
- b) Derive the mathematical expression for steady state stability of equilibrium point. (8)

Unit-II

2. a) Explain electric braking for D.C. separately excited motor, with suitable connection diagrams and speed - torque curves. (12)
- b) Explain the dynamic braking for D.C. series motor. (4)

(OR)

2. a) Discuss operation of a dual converter in different modes, feeding a separately excited dc motor drive. (8)
- b) Explain working of current control loop and speed control loop for close loop control of separately excited D.C. motor drive. (8)

Unit-III

3. a) Explain the stator voltage control for speed control of induction motor. Why this method suitable for fan and pump drives. (10)
- b) What are the advantages and disadvantages of electrical braking? Explain plugging braking. (6)

(OR)

3. Explain the following braking in induction motor drives : (2×8=16)
 - a) Dynamic braking
 - b) Regenerative braking

Unit-IV

4. a) Explain using a power circuit how the speed of an induction motor drive can be controlled by using current source inverter. (10)
- b) Compare CSI fed induction motor drive with VSI fed drive. (6)

(OR)

4. a) Explain static rotor resistance control in closed loop speed control. (8)
- b) Draw and explain a closed-loop operation for a static Kramer controlled drive. (8)

Unit-V

5. a) Explain the power factor control of synchronous motor drive. (6)
- b) Explain the braking of synchronous motor with VSI. Draw the speed torque characteristic for regenerative braking. (10)

(OR)

5. a) Explain the control of synchronous motor using current source inverter. (8)
- b) Explain the control characteristics of an open loop V/f controlled synchronous motor. (8)



8E8043

Roll No. _____

[Total No. of Pages : 3]

8E8043

B.Tech. VIII Semester (Main/Back) Examination, April/May - 2017
Electrical and Electronics Engineering
8EX3A Protection of Power System
Common with 8EE3A

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. Scientific Calculator

Unit-I

1. a) What do you understand by zone of protection? What are different characteristics of a relay? (4+4=8)
- b) A potential transformer ratio 100/10 volt has the following constants : primary resistance = 94.5Ω , secondary resistance = 0.86Ω , primary reactance = 66Ω , total equivalent reactance = 100Ω , No load current = 0.02 at 0.4 power factor. Calculate : (8)
- i) Phase angle error at no load,
- ii) Burden in VA at unit power factor at which the phase angle will be zero.

(OR)

1. a) Explain trip circuit of circuit breaker. What are the different types of circuit breaker used for protection of power system. (4+4=8)
- b) A 200/5A, 50Hz current transformer has a secondary comparing a non-inductive impedance of 1.6Ω . The primary winding has one turn. Calculate the flux in the core and ratio error of full load. Neglecting leakage reactance and assume the iron loss in the core to be 3.5w at full load. The magnetizing mmf. is 100AT. (8)

277

Unit-II

2. a) What do you mean by over current relay? Also explain the different types of over current relay. (8)
- b) How the different directional over current-relay connection are obtained? Neatly draw & explain the diagram for 30° , 60° and 90° connections. (8)

(OR)

2. a) Explain construction, working and characteristics of HRC fuse. Also write an application advantages and disadvantages of HRC fuse. (8)
- b) Explain earth fault relay. Explain time setting, plug setting and current setting of over current relay. (8)

Unit-III

3. a) A Generator is provided with restricted earth fault protection. The rating are 11kV, 5000 kVA. The percentage of winding protected against phase to ground fault is 80%. The relay setting such that it trip for 25% out of balance. Calculate the resistance to be added in neutral to ground connection. (8)
- b) What is differential protection? What is percentage differential protection? Why it is superior to simple differential protection. (8)

(OR)

3. a) The neutral point of a 10000V alternator is earthed through a resistance of 10Ω , the relay is set to operate when there is an out of balance current of 1A. The CT's have a ratio of 1000/5. What percentage of the winding is protected against fault to earth and what must be minimum value of earthing resistance to give 90% protection to each phase winding? (8)
- b) Why restricted earth fault protection is provided to alternators through it leaves a portion of winding unprotected against earth fault. Can it be justified. (8)

Unit-IV

4. a) A 3 phase 200kVA, 10000/500V transformer is connected in delta-star. The CT's on low voltage side have turn ratio of 500/s. Determine the CT ratio on high voltage side. Also obtain the insulating current when the fault of 700A of following types occur on the low voltage side : (10)
- i) Earth fault within the protective zone
- ii) Earth fault outside the protective zone. Assume balanced voltage.
- b) Draw and explain the construction and working of gas actuated relay. (6)

(OR)

4. a) What are the problem associated with transformer protection due to magnetizing inrush current? Describe the percentage biased differential relay protection scheme with harmonic restraints for transformer. (8)
- b) What is the frame leakage protection of busbars? Discuss its principle and field of applications. (8)

Unit-V

5. a) What are the different types of protection of transmission line? Explain three step distance time characteristics. (10)
- b) Explain protection against single phasing failure in induction motor. (6)

(OR)

5. a) Explain the principle of operation of distance relay. Discuss the working, torque equation, operating characteristics of the following distance relay : impedance relay, Mho relay and reactance relay. (10)
- b) Write a short note on : (6)
- Earth fault protection
 - Negative sequence relay



8E8044**8E8044****B.Tech. VIII Semester (Main/Back) Examination, April/May - 2017****Electrical & Electronics Engineering****8EX4.1A Utilization of Electrical Power****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) Explain the principle of "Dielectric heating". Derive the mathematical expression of power consumed in such process. State important applications of dielectric heating. (8)
- b) Discuss advantages and disadvantages of electric heating over conventional methods. Briefly describe different methods of electric heating. (8)

(OR)

1. a) Describe with neat sketches the various methods of electric resistance welding. Give its merits or demerits with respect to arc welding. (8)
- b) Write short note on following : (2×4=8)
 - i) Electric supply for arc welding
 - ii) Welding Transformer

Unit-II

2. a) Discuss the laws of illumination. Also explain the construction and working of high pressure mercury vapour discharge lamp. (8)
- b) Two lamp posts are 16m apart and fitted with a 100cp lamp each at a height of 6m above ground. Calculate the illumination on ground (a) Under each lamp (b) Midway between the lamps. (8)

(OR)

2. a) Explain the working of fluorescent tube with the help of the circuit diagram giving the function of various parts. How stroboscopic effect is eliminated in florescent tube lighting? (8)
- b) The front of a building $50\text{m} \times 16\text{m}$ is Illuminated by sixteen 1000W lamps arranged so that uniform illumination on the surface is obtained. Assuming a luminous efficiency of 17.4 Lomens/watt and a coefficient of utilization of 0.4, determine the illumination on the surface. (8)

Unit-III

3. a) Explain the term "polarization"; "throwing power", and "electro-deposition". How are zinc and copper refind from their base metals electrically? (8)
- b) Discuss the objectives of electroplating and describe any one process for electroplating. (8)

(OR)

3. a) List the major applications of electrolysis. Explain the basic principle of electro deposition. Discuss in detail the power supply requirements for different electrolytic processes. (8)
- b) What is meant by anodizing? Explain the process of anodizing and describe the equipments used for it. (8)

Unit-IV

4. a) Discuss the locations and layout of substations with regard to ac and dc systems of electric traction. (8)
- b) Enlist the main components of electric locomotive and state their functions. (8)

(OR)

4. a) Discuss the suitability of DC series motor for its application in electric locomotives for traction duty. (8)
- b) With the help of neat diagrams. Briefly explain any two of following : (2×4=8)
 - i) Pantograph
 - ii) Negative booster
 - iii) Interface effect of railway electrification on communication circuits

28/

Unit-V

5. a) Draw and explain a typical speed-time curve for an electric train and explain what do you understand by crest speed, average speed, and schedule speed. (8)
- b) An electric train has quadrilateral speed-time curve as follows : (6)
- i) Uniform acceleration from rest at 2kmphs for 30 seconds.
 - ii) Coasting for 50 seconds
 - iii) Braking period of 20 seconds The train is moving a uniform down gradient of 1%, tractive resistance 40 newtons per tonne, rotational inertia effect 10% of dead weight, duration of stop 15 seconds and overall efficiency of transmission gear and motor as 75%. Calculate its schedule speed and specific energy consumption of run. (8)

(OR)

5. a) Discuss methods of electric braking in traction motors? Explain how regenerative braking can be obtained in dc locomotive. (8)
- b) Write short note on any two of following : (2×4=8)
- i) Mechanics of train movement
 - ii) Tractive effort for propulsion of train
 - iii) Dead weight, accelerating weight and adhesive weight of train.



8E4112	Roll No. _____	[Total No. of Pages : 2]
	8E4112	
	B.Tech. VIII Semester (Old Back) Examination, April/May - 2017	
	Electrical and Electronics Engg.	
	8EX4.3 (O) Non Conventional Energy Sources	
	EE & EX	

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) What is role of renewable energy sources in present time for our country? (8)
- b) What are the advantages and limitations of "tidal power generation"? (8)

OR

1. a) Mention the various conventional energy sources. Also write a short note on each source. (2+6=8)
- b) Discuss the prospects of tidal energy in India. (8)

Unit-II

2. a) Explain the construction and working of a flat plate collector. Discuss the material used for different parts of flat plate collector. (6+2=8)
- b) Discuss different components of a basic solar power plant. What are its advantages over conventional power generation. (5+3=8)

OR

2. a) Enumerate the different types of concentrating type collectors. Describe a collector used in power plant for generation of electrical energy. (2+6=8)
- b) Explain the following terms related to solar radiation geometry :
 Declination, Hour angle, Attitude angle, Zenith angle, Surface Azimuth angle, Solar Azimuth angle, day length, Local Apparent time. (1×8=8)

Unit-III

3. a) Describe with neat sketch working of a geothermal power plant. (8)
 b) What is the maximum efficiency of conversion of wind machine? Discuss its principle of conversion. (3+5=8)

OR

3. a) Describe basic components of a wind energy conversion system. Write their functions. (4+4=8)
 b) i) How geothermal energy is useful for application point of view. (4)
 ii) Write the advantages of geothermal energy. (4)

Unit-IV

4. a) What is fusion reaction? What are the main fusion reactions? Which one is the most favourable reaction for power generation and why? (2+2+4=8)
 b) What are the advantages and disadvantages of using nuclear fusion for power generation? (8)

OR

4. a) Describe various methods of Plasma confinement. (8)
 b) Describe with neat sketch the working of laser fusion reactor. (8)

Unit-V

5. a) Explain the construction details and working of floating gas holder type bio gas plant. (4+4=8)
 b) What is biomass? Explain the thermo-chemical conversion technologies of biomass. (2+6=8)

OR

5. a) Explain the construction and operation of Dean Bandhu biogas plant. (4+4=8)
 b) Write short note on : (4+4=8)
 i) Pyrolysis scheme
 ii) Ethanol production



Roll No. _____

[Total No. of Pages : 2]

8E4111**8E4111****B.Tech. VIII Semester (Old Back) Examination, April/may, 2017****Electrical Engg.****8EE3 Switchgear and Protection****EE & EX****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 26****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Unit-I

1. a) Give a classification of various types of amplitude and phase comparators. (6)
- b) Describe the construction and working of circulating current type and phase-splitting type amplitude comparator. (10)

OR

1. a) Draw the neat figure of coincidence type phase comparator and describe its working. (6)
- b) Draw the block diagram and explain working of static directional over current relays. (10)

Unit-II

2. Describe how a two-input phase comparator relay depending on inputs can function as a static distance relay and draw the relevant figures in realizing this relay and to represent the various parameters waveforms for this relay. (16)

OR

2. Describe how rectifier bridge amplitude comparator depending on inputs can function as a static differential relay and draw the relevant diagrams. Also mention the advantages and application of static differential relay. (16)

28

Unit-III

3. a) Describe the basic scheme of power line carrier scheme. (6)
- b) Explain the principle of operation of carrier assisted distance protection. Draw relevant diagrams for this. (10)

OR

3. a) Explain how the performance of distance relay is affected by power swings. (6)
- b) Describe and explain "out of step tripping" and "blocking relays" purpose and working. (10)

Unit-IV

4. Explaining electric arc characteristics, describe the principle and details of "recovery rate" and "energy balance" arc interruption theories. (4+6+6)

OR

4. Define restriking voltage and recovery voltage. Explain the phenomenon when circuit breaker tries to switch out an unloaded transformer. Also describe the principle of working of minimum and air circuit breakers. (4+6+6)

Unit-V

5. Explain various ratings of circuit breakers and criteria for selection of type of various circuit breakers for various purposes and voltage ranges. Describe the principle and working of vacuum circuit breakers. (5+5+6)

OR

5. Explain how the digital protection is realized in transformer differential and transmission line distance protection. Draw the typical block diagrams for these and explain main blocks. (5+5+6)

